

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A method of through-etching a substrate, the method comprising:
forming a buffer layer on a first plane of the substrate;
forming a metal layer on the buffer layer;
forming an etching mask pattern on a second plane opposite to the first plane;
and
through-etching the substrate with the etching mask pattern as an etching mask;
removing the etching mask pattern;
removing the metal layer; and
removing the buffer layer.
2. (Original) The method of claim 1, further comprising forming a recess region on the first plane before forming the buffer layer on the first plane.
3. (Cancelled)
- 3 4. (Original) The method of claim 1, wherein the substrate is formed of a single-crystal silicon.
- 4 5. (Original) The method of claim 1, wherein the buffer layer is formed of silicon dioxide.

5 6. (Original) The method of claim 1, wherein the metal layer is formed of aluminum.

6 7. (Original) The method of claim 1, wherein through-etching the substrate is performed by deep reaction ion etching (DRIE).

7 8. (Currently Amended) A method of through-etching a substrate, the method comprising:

forming a recess region of a predetermined depth on a first plane of the substrate;

forming a first buffer layer on the first plane of the substrate having the recess region;

forming a first metal layer on the first buffer layer;

forming a first etching mask pattern on a second plane of the substrate opposite to the first plane, for exposing at least a portion of a region corresponding to the recess region; and

through-etching the substrate with the first etching mask pattern as an etching mask;

removing the first etching mask pattern that is the photoresist pattern;

removing the first metal layer; and

removing the first buffer layer.

8 9. (Original) The method of claim 8, wherein forming the recess region on the first plane of the substrate comprises:

forming a second etching mask pattern on the first plane of the substrate;

etching a portion of the substrate with the second etching mask as an etching mask; and

removing the second etching mask pattern.

9 10. (Original) The method of claim ⁸9, wherein the second etching mask pattern is a photoresist pattern.

10 11. (Original) The method of claim ⁸9, wherein the second etching mask pattern is a stacked structure comprising a second buffer layer and a second metal layer.

11 12. (Original) The method of claim ⁷8, wherein the first etching mask pattern is a photoresist pattern.

12 13. (Original) The method of claim ⁷8, wherein the first etching mask pattern is a stacked structure comprising a third buffer layer and a third metal layer.

14 14. (Original) The method of claim ⁷8, further comprising wet-etching the first buffer layer that is exposed by the through-etching of the substrate.

15. (Cancelled)

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13 16. (Original) The method of claim ¹²13, after through-etching the substrate, further comprising:

removing the third metal layer of the first etching mask pattern and the first metal layer; and

removing the third buffer layer of the first etching mask pattern and the first buffer layer.

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15¹⁷. (Original) The method of claim 8¹, wherein the substrate is formed of a single-crystal silicon.

16¹⁸. (Original) The method of claim 8⁷, wherein the buffer layer is formed of silicon dioxide.

17¹⁹. (Original) The method of claim 8⁷, wherein the metal layer is formed of aluminum.

18²⁰. (Currently Amended) The method of claim 8, wherein through-etching the substrate is performed by ~~DIRE~~ DRIE.

19²¹. (Original) The method of claim 8⁷, wherein a portion of the substrate which is penetrated by the through-etching of the substrate comprises the recess region.